

A Sustainable Environment: Our Obligation to Protect God's Gift

by
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What are Some Issues with Electric Vehicles?

There are four different types of electric automobiles currently available. 1) The hybrid electric vehicle uses a small electric battery to supplement a standard internal combustion engine and increase fuel efficiency by about 25 percent. The battery is recharged by the gasoline engine and regenerative braking. Regenerative braking converts kinetic energy that otherwise would be lost as heat in the brake pads into electricity to charge the battery. The Ford Fusion Hybrid and Toyota Prius are examples of this type of hybrid. 2) The plug-in hybrid is very similar to the hybrid electric vehicle except the plug-in allows you to also charge the battery from an external electric source. 3) An extended-range electric vehicle uses a small internal combustion engine to power an electric generator that charges the battery. The car is powered by an electric motor that runs on batteries, and as the batteries lose their charge, the electric generator recharges the batteries – all while the car is being driven. The batteries can also be recharged by plugging into the grid. An example of this type of car is the Chevrolet Volt. 4) The battery electric vehicles are all electric and have no internal combustion engine like the other three. This car relies exclusively on batteries which must be recharged often via the electric grid. Examples of this car are the Nissan Leaf and the Tesla.

The hybrid, plug-in hybrid and extended-range vehicles can only travel about 40 miles on batteries only and must activate the internal combustion engine for longer travels. Also, with a hybrid or plug-in hybrid traveling on highways at high speeds, the car runs primarily with the gasoline engine while the electric motor kicks in for higher speeds or acceleration, so this would defeat the great economics of using the batteries. The hybrids only make sense for short commutes and city driving as the premium to purchase this car may not be justified if the car is for highway use. Similarly, the extended-range electric car is great for traveling less than 40 miles after which it can be plugged in for recharging. In this manner, there is no need for the gas engine to charge the batteries. However, if this car is used for long travels and requires the gas engine for keeping the batteries charged, the economy in terms of miles per gallon is excellent.

The all electric cars, which have a range of 100-200 miles, are the most interesting, but have one major disadvantage. Traveling farther than this range requires recharging the batteries that could take 30 minutes to six hours depending on the voltage of the recharging system. An answer to this problem is the establishment of change-out stations. A company called Better Place developed a system whereby subscribers can pull into a location where the used batteries can be replaced with fully-charged ones within a few minutes – about the same time it takes to refuel a gasoline engine. The used batteries would then be recharged for another customer. Unfortunately, Better Place recently filed for bankruptcy due to very low sales. Tesla is planning a similar offering in a few high-sales markets. The future of each of these cars will depend on the improvement of battery capacity and economics. Also, charging of these batteries should ideally be done through renewable energies sources like solar or wind. In this manner no fossil

fuels are consumed and no carbon dioxide is emitted while charging the batteries. This was the concept of Better Place with its systems in Israel, Denmark and Hawaii.

In the meantime, these four types of electric vehicles, sometimes called “green cars”, along with high-gas-mileage cars are causing another problem in the U.S. The purchase price of gasoline includes a tax for the maintenance of the roads and highways. Since these green cars consume considerably less gasoline, the funding for our roads is decreasing. In fact, the total funds collected have decreased every year since 2004 as green cars today account for 3.3% of all cars.

Some states are already making some changes to compensate for this decrease in gasoline tax. The State of Oregon is now charging \$542 per year for any all electric vehicle and is considering including any vehicle that gets over 55 miles per gallon. The State of Washington currently has imposed a fee of \$100, while Virginia will soon be charging \$64 per year for all electric cars. It is interesting to note the large variation between these states which cannot be explained. Seven other states including New Jersey, Indiana and North Carolina are also considering imposing a special highway tax on electric vehicles.

So what can we expect from cars in the near future. Perhaps the answer is the air car which runs on compressed air. Just pull into a station that generates compressed air and fill up your tank. However, what kind of fuel is required to produce the compressed air? Is it fossil fuel or renewable energy? This will be the important issue in years to come – but not in the distant future. Now!